

WHAT IS CLAIMED IS:

1. A vibrator controlling circuit comprising:

a square wave generating circuit for generating a square wave signal whose frequency changes according to the value of  
5 a voltage applied to a controlling terminal;

a switching element which is turned on/off on the basis of said square wave signal to supply a driving current to a vibrator;  
and

a frequency shift detecting circuit for detecting a frequency

10 shift between the square wave signal from said square wave generating circuit and a resonance frequency of said vibrator,  
wherein

a shift in the frequency generated by said square wave generating circuit is trimmed by a signal detected by said frequency  
15 shift detecting circuit.

2. A vibrator controlling circuit according to claim 1,  
wherein said switching element is a MOS transistor.

20 3. A vibrator controlling circuit according to claim 1,  
wherein the square wave signal generated by said square wave generating circuit is divided by a half-divider and the divided signal is applied to said switching element.

25 4. A vibrator controlling circuit according to claim 1,  
wherein said frequency shift detecting circuit includes a first

switching element for switching a vibrating wave signal from said vibrator; an operational amplifier with the one input terminal supplied with a signal passed said first switching element and the other terminal supplied with the vibrating wave signal as 5 it is; and a second switching element for passing an output signal from said operational amplifier to be supplied to a CTL terminal of said square wave generating circuit.

5. A vibrator controlling circuit according to claim 4,  
10 wherein said first switching element is ON during 0 - 40 % of said square wave signal, said second switching element is ON during 40 - 100 % of said square wave signal, and 0 - 40 % and 40 % - 100 % of said vibrating wave signal are compared with each other.

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6. A vibrator controlling circuit according to claim 1,  
wherein said square wave generating circuit, switching element and frequency shift detecting circuit are constructed of a single chip.

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7. A vibrator controlling circuit according to Claim 1,  
wherein said square wave generating circuit further comprises  
a CONT terminal, a CONT signal supplied to the CONT terminal  
turns on the square wave generating circuit when the CONT signal  
25 changes from a first level to a second level upon a detection  
of a ringing signal.

8. A vibrator controlling circuit according to Claim 3,  
wherein said half-divider further comprises a CONT terminal,  
a CONT signal supplied to the CONT terminal turns on the half-divider  
5 when the CONT signal changes from a first level to a second level  
upon a detection of a ringing signal.

9. A vibrator controlling circuit according to Claim 4,  
wherein said operational amplifier in said frequency shift  
10 detecting circuit further comprises a CONT terminal, a CONT signal  
supplied to the CONT terminal turns on the operational amplifier  
when the CONT signal changes from a first level to a second level  
upon a detection of a ringing signal.